

FORM PTO-1390 (Modified)
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

220246US0PCT

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

10/088521

INTERNATIONAL APPLICATION NO.
PCT/EP00/09921INTERNATIONAL FILING DATE
10 October 2000PRIORITY DATE CLAIMED
19 October 1999

TITLE OF INVENTION

THICKENERS FOR AQUEOUS DISPERSIONS

APPLICANT(S) FOR DO/EO/US

SCHNELL Klaus et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☐ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

PCT/IB/304

PCT/IB/308 / Cited References (3)

Form PTO-1449 / Statement of Relevancy

Request for Priority / Amended Sheets (Pages 8 and 9)

U.S. APPLICATION NO. (IF KNOWN) 10/088521		INTERNATIONAL APPLICATION NO. PCT/EP00/09921		ATTORNEY'S DOCKET NUMBER 220246US0PCT	
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24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 <div style="text-align: right;">ENTER APPROPRIATE BASIC FEE AMOUNT =</div>				CALCULATIONS PTO USE ONLY	
				\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				\$0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	9 - 20 =	0	x \$18.00	\$0.00	
Independent claims	3 - 3 =	0	x \$84.00	\$0.00	
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$890.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0.00	
SUBTOTAL =				\$890.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				\$0.00	
TOTAL NATIONAL FEE =				\$890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$890.00	
				Amount to be: refunded \$	
				charged \$	

a. ☒ A check in the amount of **\$890.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.


c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **15-0030** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

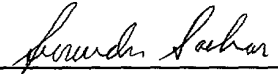
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Surinder Sachar
 Registration No. 34,423



22850


 SIGNATURE
Norman F. Oblon
 NAME
24,618
 REGISTRATION NUMBER
March 29 2002
 DATE

220246US-0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :
KLAUS SCHNELL ET AL : ATTN: APPLICATION DIVISION
SERIAL NO: NEW U.S. PCT APPLN :
(Based on PCT NO/EP00/09921)
FILED: HEREWITH : EXAMINER:
FOR: THICKENERS FOR AQUEOUS :
DISPERSIONS

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as follows:

IN THE CLAIMS

Please amend the claims as shown on the marked-up copy following this amendment to read as follows:

1. (Amended) A process comprising
mixing an addition copolymer and an aqueous polymer dispersion to thicken said aqueous dispersion,
wherein said addition polymer is composed of
 - a) from 30 to 79.5% by weight of N-vinylpyrrolidone,
 - b) from 20 to 69.5% by weight of vinyl acetate,

- c) from 0.5 to 25% by weight of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid, and
- d) from 0 to 40% by weight of a further, copolymerizable, ethylenically unsaturated compound,

and the percentages by weight in each case based on the weight of said copolymer.

2. (Amended) The process as claimed in claim 1, wherein c) is a monovinyl ester of a branched monocarboxylic acid having at least one tertiary or quaternary carbon atom.

3. (Amended) The process as claimed in claim 1, wherein c) is a monovinyl ester of a C₅ to C₁₅ monocarboxylic acid.

4. (Amended) The process as claimed in claim 1, wherein c) is a monovinyl ester of a Versatic acid.

5. (Amended) An aqueous polymer dispersion comprising a thickener, wherein said thickener is an addition copolymer composed of

- a) from 30 to 79.5% by weight of N-vinylpyrrolidone,
- b) from 20 to 69.5% by weight of vinyl acetate,
- c) from 0.5 to 25% by weight of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid, and
- d) from 0 to 40% by weight of a further, copolymerizable, ethylenically unsaturated compound,

and the percentages by weight in each case based on the weight of said copolymer.

6. (Amended) The aqueous dispersion as claimed in claim 5, which further comprises a dispersion of a free-radically polymerized polymer, a polyester or a polyurethane.

7. (Amended) The aqueous dispersion as claimed in claim 6, wherein the free-radically polymerized polymer is a polymer composed of not more than 50% by weight of one or more principal monomers selected from the group consisting of C₁ to C₁₈ alkyl (meth)acrylates, vinyl esters of C₁ to C₂₀ carboxylic acids, vinylaromatic compounds having up to 20 carbon atoms, vinyl halides, nonaromatic hydrocarbons having one or two conjugated double bonds and mixtures thereof.

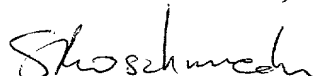
8. (Amended) The aqueous polymer dispersion as claimed in claim 5, containing from 0.2 to 20 parts by weight of the addition copolymer per 100 parts by weight of a dispersed polymer.

REMARKS

Claims 1-9 are active in the present application. Claims 1-8 have been amended to remove multiple dependencies and for clarity. No new matter is believed to have been added by this amendment. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
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Marked-Up Copy

Serial No: _____

Amendment Filed on:

3-29-2002

IN THE CLAIMS

--1. (Amended) [The use of] A process comprising
mixing an addition copolymer [composed of] and an aqueous polymer dispersion to
thicken said aqueous dispersion,

wherein said addition polymer is composed of

- a) from 30 to 79.5% by weight of N-vinylpyrrolidone,
- b) from 20 to 69.5% by weight of vinyl acetate,
- c) from 0.5 to 25% by weight of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid, and
- d) from 0 to 40% by weight of a further, copolymerizable, ethylenically unsaturated compound,

and the percentages by weight in each case [being] based on the weight of said copolymer[, as a thickener for an aqueous polymer dispersion].

2. (Amended) The [use] process as claimed in claim 1, wherein c) [comprises the] is
a monovinyl ester of a branched monocarboxylic acid having at least one tertiary or quaternary carbon atom.

3. (Amended) The [use] process as claimed in claim 1[or 2], wherein c) [comprises the] is a monovinyl ester of a C₅ to C₁₅ monocarboxylic acid.

4. (Amended) The [use] process as claimed in [any of claims 1 to 3] claim 1, wherein c) [comprises the] is a monovinyl ester of a Versatic acid.

5. (Amended) An aqueous polymer dispersion comprising [as] a thickener [a copolymer as in any of claims 1 to 4] , wherein said thickener is an addition copolymer composed of

- a) from 30 to 79.5% by weight of N-vinylpyrrolidone,
- b) from 20 to 69.5% by weight of vinyl acetate,
- c) from 0.5 to 25% by weight of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid, and
- d) from 0 to 40% by weight of a further, copolymerizable, ethylenically unsaturated compound,

and the percentages by weight in each case based on the weight of said copolymer.

6. (Amended) [An] The aqueous dispersion as claimed in claim 5, which further comprises a dispersion of a free-radically polymerized polymer, [of] a polyester or [of] a polyurethane.

7. (Amended) [An] The aqueous dispersion as claimed in claim [5] 6, wherein [said] the free-radically polymerized polymer is a polymer composed [to the extent of] of not more than 50% by weight of one or more principal monomers selected from the group consisting of C₁ to C₁₈ alkyl (meth)acrylates, vinyl esters of C₁ to C₂₀ carboxylic acids, vinylaromatic compounds having up to 20 carbon atoms, vinyl halides, nonaromatic hydrocarbons having one or two conjugated double bonds[, or] and mixtures [of these monomers] thereof.

8. (Amended) [An] The aqueous polymer dispersion as claimed in [any of claims 5 to 7] claim 5, containing from 0.2 to 20 parts by weight of the [thickening] addition copolymer per 100 parts by weight of [the] a dispersed polymer.--

DOCKET NO.: 220246US0PCT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Klaus SCHNELL, et al.

SERIAL NO.: NEW U.S. PCT APPLICATION

FILED: HERewith

INTERNATIONAL APPLICATION NO.: PCT/EP00/09921

INTERNATIONAL FILING DATE: October 10, 2000

FOR: THICKENERS FOR AQUEOUS DISPERSIONS

REQUEST FOR PRIORITY UNDER 35 U.S.C. 119
AND THE INTERNATIONAL CONVENTIONAssistant Commissioner for Patents
Washington, D.C. 20231

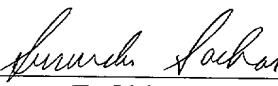
Sir:

In the matter of the above-identified application for patent, notice is hereby given that the applicant claims as priority:

COUNTRY
Germany**APPLICATION NO**
199 50 229.3**DAY/MONTH/YEAR**
19 October 1999

Certified copies of the corresponding Convention application(s) were submitted to the International Bureau in PCT Application No. PCT/EP00/09921. Receipt of the certified copy(s) by the International Bureau in a timely manner under PCT Rule 17.1(a) has been acknowledged as evidenced by the attached PCT/IB/304.

Respectfully submitted,
OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Norman F. Oblon
Attorney of Record
Registration No. 24,618
Surinder Sachar
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Thickeners for aqueous dispersions

The invention relates to

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an addition copolymer of

- a) from 30 to 79.5% by weight of N-vinylpyrrolidone
- b) from 20 to 69.5% by weight of vinyl acetate
- 10 c) from 0.5 to 25% by weight of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid
- d) from 0 to 40% by weight of a further, copolymerizable, ethylenically unsaturated compound,

- 15 the percentages by weight in each case being based on the said copolymer.

The invention further relates to the use of the above copolymer as a thickener for aqueous polymer dispersions.

20

Aqueous polymer dispersions are used as binders for environment-friendly adhesives, paints, impregnating compositions or other coating compositions. Depending on the intended use, the polymer dispersions may include further additives; examples that

- 25 may be mentioned include fillers, pigments, pigment dispersants, film formers (plasticizers, solvents, resins), defoamers, wetting agents and, in particular, thickeners.

- The addition of thickeners establishes the desired viscosity and
30 rheology.

- The thickeners are therefore of great importance for processing properties such as flow behavior and brushability. The properties of the coatings obtained after drying, however, should not be
35 adversely affected by the thickener. In particular, thickeners should not result in a reduction in water resistance or in impaired adhesion in the case of adhesives.

- Customary organic thickeners, such as hydroxyethylcellulose,
40 polyvinyl alcohol and polyacrylic acid (acrylate thickeners), for example, often do adversely affect the water resistance and the adhesion spectrum.

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Inorganic thickeners, an example being bentonite, ultimately act like a filler. In the case of adhesives, they lead to reduced adhesion and, in general, bring about clouding of the resultant coating.

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Thickeners based on N-vinylpyrrolidone are among those already known.

The use of N-vinylpyrrolidone copolymers is described, for
10 example, in DE-A-2224129. ✓

Known, for example, are commercially customary thickeners based on copolymers of N-vinylpyrrolidone and vinylpropionate (Collacral®, BASF).

15

The activity of these thickeners is often still not sufficient; it is desired that the amount of thickener required be reduced further. In particular, the thickener should be equally effective in the acidic, neutral and alkaline pH range.

20

It is an object of the present invention to provide, for aqueous polymer dispersions, thickeners which possess a high level of activity, i.e., are effective even in small amounts, and which do not exhibit the above disadvantages, or do so only to a minor

25 extent.

We have found that this object is achieved by means of the addition copolymer defined at the outset. We have also found that the copolymer can be used as a thickener for aqueous polymer

30 dispersions.

An addition copolymer consists of

a) from 30 to 79.5% by weight, preferably from 35 to 74.5% by
35 weight, with particular preference from 50 to 69% by weight, of N-vinylpyrrolidone,

b) from 20 to 69.5% by weight, preferably from 25 to 64.5% by
weight, with particular preference from 30 to 49% by weight,
40 of vinyl acetate,

c) from 0.5 to 25% by weight, preferably from 0.5 to 15% by
weight, with particular preference from 1 to 10% by weight,
of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid, and

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- d) from 0 to 40% by weight, preferably from 0 to 30% by weight, with particular preference from 0 to 15% by weight, of a further, copolymerizable, ethylenically unsaturated compound.

5 The percentages by weight are based on the copolymer.

Monomers c) preferably comprise a monovinyl ester of a branched monocarboxylic acid, i.e., of a monocarboxylic acid having at least one tertiary or quaternary carbon atom. Tertiary carbon
10 atoms have three adjacent carbon atoms and one hydrogen atom. Quaternary carbon atoms have four adjacent carbon atoms and no hydrogen atoms.

The monocarboxylic acids preferably have a tertiary or quaternary
15 carbon atom; with particular preference, the tertiary or quaternary carbon atom is attached directly to the carboxyl group (COOH).

The monocarboxylic acid has preferably from 5 to 15 carbon atoms,
20 more preferably from 8 to 12 carbon atoms and, in particular, 9 or 10 carbon atoms. With particular preference, the monocarboxylic acid has a quaternary carbon atom attached directly to the carboxyl group.

25 Monocarboxylic acids of this kind are known in the form of Versatic acids® (Shell).

Examples that may be mentioned include 2,2-dimethylolpropionic acid, 2,2-dimethylbutyric acid, 2-ethylbutyric acid, and
30 2-methylbutyric acid.

The respective monovinyl ester of the monocarboxylic acid is obtainable by esterification using vinyl alcohol.

35 Further monomers, d), can be, for example, alkyl acrylates or other vinyl esters. The use of further monomers is not necessary in order to obtain the desired activity as thickeners.

The addition copolymer can be obtained by free-radical
40 polymerization of the compounds a) to d).

Particularly suitable is solution polymerization in water or in a mixture of water and organic solvent.

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The copolymer is preferably in the form of a solution or dispersion in water, the amount of the copolymer being, for example, from 5 to 70% by weight, preferably from 20 to 60% by weight, based on the solution or dispersion (water + copolymer).

5

The copolymer is preferably used in the form of the aqueous solution or dispersion.

- 10 The copolymer preferably has a K value of from 30 to 100. The K value according to Fikentscher (Cellulose-Chemie 13, 1932, pages 58-64) is a measure of the molecular weight and is measured on a 1% solution of the copolymer in water (23°C).

- 15 The copolymer is suitable as a thickener for aqueous dispersions of polymers. These can be, for example, free-radically polymerized polymers, polyesters, or polyurethanes.

- 20 Within the aqueous dispersion, the polymers are present in the form of dispersed particles. The dispersed particles can be stabilized by emulsifiers or protective colloids; alternatively, the polymers may be self-dispersing as a result of the incorporation of hydrophilic groups.

- 25 Aqueous dispersions of free-radically polymerized polymers can be obtained readily by emulsion polymerization.

- 30 Aqueous dispersions of free-radically polymerized polymers, polyurethanes and polyesters can also be obtained, for example, by solution polymerization in an organic solvent and subsequent dispersion of the polymer in water.

- 35 In the case of the free-radically polymerized polymers, preferred polymers are those which are composed to the extent of more than 50% by weight of principal monomers selected from C₁ to C₁₈ alkyl (meth)acrylates, vinyl esters of C₁ to C₂₀ carboxylic acids, vinylaromatic compounds having up to 20 carbon atoms, vinyl halides, nonaromatic hydrocarbons having one or two conjugated double bonds, or mixtures of these monomers.

- 40 For use as a thickener, the copolymer of the monomers a) to d) can be added in the desired amount to the polymer dispersions. Suitable amounts are from 0.2 to 20 parts by weight, with particular preference from 0.5 to 5 parts by weight and, with very particular preference, from 0.7 to 2.5 parts by weight of
45 copolymer per 100 parts by weight of the polymer.

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Depending on the intended use, the aqueous polymer dispersion may include further additives in addition to the thickener, examples being dyes, fillers, pigments, film formers, defoamers, etc. Possible uses include adhesives, coating compositions, paints, or

5 impregnating compositions. Within the aqueous dispersions the addition copolymer acts as a thickener without impairing the performance properties when the dispersion is used. In particular, the transparency of coatings, and the adhesion in the case of use as an adhesive, is not adversely affected.

10

Example

Preparing a thickener

15 Initial charge:

	113.42 ml	of feed stream 1
	10.89 ml	of feed stream 3
20	14.79 g	of isopropanol

Feed stream 1:

	311.93 g	of N-vinylpyrrolidone
25	329.63 g	of vinyl acetate
	26.73 g	of VeoVa 9 (vinyl ester of Versatic acid)
	45.44 g	of isopropanol
	269.55 g	of deionized water

30

Feed stream 2: 222.6 g of N-vinylpyrrolidone

Feed stream 3:

35	42.74 g	of isopropanol
	2.27 g	of 2,2'-azobis(methylbutyronitrile)

Feed stream 4:

40	642.08 g	of deionized water
	0.38 g	of hydrogen peroxide, 50% strength

Feed stream 5

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	1225.63 g	of deionized water
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The initial charge is placed in a pressure vessel at 0.5 bar and heated to about 70°C.

Feed stream 2 and the remainder of feed stream 1 are mixed (feed stream mixture).

The feed stream mixture is metered in over 4 hours and feed stream 3 is commenced simultaneously and metered in over 3.5 hours. After the end of feed stream 3, feed stream 4 is metered in over 0.5 hour.

After the end of feed stream 3, the temperature is held at about 72°C for a total of 2 hours more. Then feed stream 5 is added and the organic solvent is distilled off.

A solids content of 30% by weight is established using water. The K value of the resulting copolymer was 56; the viscosity of a 20% strength by weight solution at 23°C in accordance with DIN 53211 is 77 sec.

The viscosity is 3100 mPas (23°C) at a shear rate of 250 s⁻¹ (DIN EN ISO 3219). The pH is 4.3.

Comparative Example

The comparative example was conducted in accordance with the inventive example.

The composition of feed stream 1, however, was as follows:

311.93 g	of N-vinylpyrrolidone
356.36 g	of vinyl acetate
45.44 g	of isopropanol
269.55 g	of deionized water

A solids content of 30% by weight is established using water. The K value of the copolymer is 63. The viscosity of a 20% strength by weight solution at 23°C in accordance with DIN 53211 is 55 s.

The viscosity of a 30% strength by weight solution is 2500 mPas at a shear rate of 250 s⁻¹ (23°C).

Table 1: Composition of the thickeners in % by weight

	Inventive example	Comparative example
5 N-Vinylpyrrolidone	60	60
Vinyl acetate	37	40
Veova 9*	3	-

* Vinyl ester of Versatic acid having 9 carbon atoms (CAS Number 54423-67-5)

10

II. Testing as thickeners in aqueous polymer dispersions

1% by weight of the 30% thickener from the inventive or comparative example, respectively, was mixed with 99% by weight

15 of the commercial dispersion Acronal V 210 (69% acrylate dispersion) or Luphen D 200 A (40% polyurethane dispersion) at 23°C with stirring. After 24 hours, the viscosity of the thickened and unthickened samples was measured.

20 Table 2: Comparison of the viscosity of the plain dispersion and of the thickened dispersion with the thickener from the inventive example and comparative example

25	Sample	Viscosity in mPas at a shear rate of 250s ⁻¹ and 23°C
	Acronal V 210 without thickener	250
	Acronal V 210 with 1% of thickener from the inventive example	2200
30	Acronal V 210 with 1% of thickener from the comparative example	400
	Luphen D 200 A	55
35	Luphen D 200 A with 1% of thickener from the inventive example	180
	Luphen D 200 A with 1% of thickener from the comparative example	60

40

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We claim:

1. The use of an addition copolymer composed of
 - a) from 30 to 79.5% by weight of N-vinylpyrrolidone
 - b) from 20 to 69.5% by weight of vinyl acetate
 - c) from 0.5 to 25% by weight of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid
 - d) from 0 to 40% by weight of a further, copolymerizable, ethylenically unsaturated compound,

the percentages by weight in each case being based on the said copolymer, as a thickener for an aqueous polymer dispersion.
2. The use as claimed in claim 1, wherein c) comprises the monovinyl ester of a branched monocarboxylic acid having at least one tertiary or quaternary carbon atom.
3. The use as claimed in claim 1 or 2, wherein c) comprises the monovinyl ester of a C₅ to C₁₅ monocarboxylic acid.
4. The use as claimed in any of claims 1 to 3, wherein c) comprises the monovinyl ester of a Versatic acid.
5. An aqueous polymer dispersion comprising as thickener a copolymer as in any of claims 1 to 4.
6. An aqueous dispersion as claimed in claim 5, which comprises a dispersion of a free-radically polymerized polymer, of a polyester or of a polyurethane.
7. An aqueous dispersion as claimed in claim 5, wherein said free-radically polymerized polymer is a polymer composed to the extent of more than 50% by weight of principal monomers selected from C₁ to C₁₈ alkyl (meth)acrylates, vinyl esters of C₁ to C₂₀ carboxylic acids, vinylaromatic compounds having up to 20 carbon atoms, vinyl halides, nonaromatic hydrocarbons having one or two conjugated double bonds, or mixtures of these monomers.
8. An aqueous dispersion as claimed in any of claims 5 to 7, containing from 0.2 to 20 parts by weight of the thickening copolymer per 100 parts by weight of the dispersed polymer.

9. An addition copolymer composed of

- a) from 30 to 79.5% by weight of N-vinylpyrrolidone
- b) from 20 to 69.5% by weight of vinyl acetate
- 5 c) from 0.5 to 25% by weight of a monovinyl ester of a
branched C₄ to C₂₀ monocarboxylic acid having at least
one tertiary or quaternary carbon atom
- d) from 0 to 40% by weight of a further, copolymerizable,
ethylenically unsaturated compound,

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the percentages by weight in each case being based on the
said copolymer.

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(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
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— Mit internationalem Recherchenbericht.

(72) Erfinder; und

Zur Erklärung der Zweibuchstaben-Codes, und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(75) Erfinder/Anmelder (nur für US): **SCHNELL, Klaus**

WO 01/29100 A1

(54) Title: THICKENER FOR AQUEOUS DISPERSIONS

(54) Bezeichnung: VERDICKER FÜR WÄSSRIGE DISPERSIONEN

(57) Abstract: The invention relates to the aqueous preparation of a polymer. Said preparation contains a copolymer consisting of a) 30 to 79.5 wt. % N-vinylpyrrolidone, b) 20 to 69.5 wt. % vinylacetate, c) 0.5 to 25 wt. % of a monovinyl ester of a C₄ to C₂₀ monocarboxylic acid and d) 0 to 40 wt. % of an additional, copolymerisable, ethylenically unsaturated compound.

(57) Zusammenfassung: Wässrige Zubereitung eines Polymeren, enthaltend ein Copolymerisat aus a) 30 bis 79,5 Gew.-% N-Vinylpyrrolidon, b) 20 bis 69,5 Gew.-% Vinylacetat, c) 0,5 bis 25 Gew.-% eines Monovinylesters einer C₄- bis C₂₀-Monocarbonsäure, d) 0 bis 40 Gew.-% einer weiteren, copolymerisierbaren, ethylenisch ungesättigten Verbindung.

Declaration, Power of Attorney

Page 1 of 3

0050/050812

We (I), the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first, and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

THICKENERS FOR AQUEOUS DISPERSIONS

the specification of which

☐ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and amended on _____.

☒ was filed as PCT international application

Number PCT/EP00/09921

October 10, 2000
on _____

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)–(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

Application No.	Country	Day/Month/Year	Priority Claimed
19950229.3	Germany	19 October 1999	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

plusvopet001 - 55

We (I) hereby claim the benefit under Title 35, United States Codes, § 119(e) of any United States provisional application(s) listed below.

(Application Number)

(Filing Date)

(Application Number)

(Filing Date)

We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Application Serial No.

Filing Date

Status (pending, patented,
abandoned)

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

And we (I) hereby appoint:

Norman F. Oblon, Registration Number ~~24,618~~;
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 Richard L. Treanor, Registration Number ~~36,379~~;
 Robert W. Hahl, Registration Number ~~33,893~~;

our (my) attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith; and we (I) hereby request that all correspondence regarding this application be sent to the firm of **OBLON, SPIVAK, McCLELLAND, MAIER & NEUSTADT, P. C.**, whose Post Office Address is: Fourth Floor, 1755 Jefferson Davis Highway, Arlington, Virginia 22202.

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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